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Note

An analysis of trends in air travel behaviour using four related SP datasets collected between 2000 and 2005

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A B S T R A C T

A growing number of studies of air travel behaviour make use of data collected through stated choice surveys. However, while these studies all produce useful results in their own right, they are limited to the context of each specific study. We address this issue by using data from four related surveys carried out between 2000 and 2005. The analysis shows a level of consistency in some of the sensitivities, but also highlights trends such as reduced willingness-to-pay measures, potentially influenced by the growing number of low cost flight options, lack of service differentiation among the carriers, and increased use of online ticketing, which has led to greater fare transparency.

1. Introduction

Over the past decade, the US domestic air service market has seen a number of very significant changes. The year 2000 capped an extended period of continuous growth in air passengers; growth that was accompanied by significant capacity issues at major airports with a corresponding increase in delays. These conditions changed dramatically after the terrorist attacks of September 2001. Air passenger and flight traffic dropped dramatically, with corresponding reductions in airport congestion, while door-to-door air travel times were affected by the significant new security screening procedures that were instituted. Over the past eight years, conditions have continued to change, with air passengers exceeding 2000 volumes by 2004, peaking in 2007 and falling again in 2008/2009 as a result of the economic recession. Low cost carriers penetrated virtually all major travel markets with dramatic rises in their market shares.

This paper considers the question as to whether and how much the basic choice processes that travellers use to select flight alternatives have changed over this period. Over the period of 2000–2008, five waves of a US domestic air traveller survey were fielded (Resource Systems Group, 2002). The survey, administered to about 600 travellers in each wave, includes detailed questions about all of the key aspects of the air travel experience. It also includes stated preference exercises that explore the trade-offs that travellers make among fare levels and the numerous key components of air service. The core survey questions and the stated preference sections in particular are included in each wave, allowing analyses of year-to-year trends. In each wave, different topical emphases have been added, but the stated preference exercise remained as a common component used to estimate the trade-offs that travellers make among the core air travel service attributes that distinguish among alternative flight itineraries.

The data from these surveys demonstrate that the types of air trips being made have changed (e.g. fewer short trips because of the additional time required for security checks), that the ways in which customers acquire tickets have changed (substantial shift to flight searches and self-ticketing on the web) and that preferences among individual airlines and airports have shifted predictably as conditions and services have changed.

Data from the stated preference experiments in each of the survey waves have also been analysed in detail and the results have been presented in Adler et al. (2005); Hess (2007, 2008, 2009); Hess et al. (2007); Bhat et al. (2006); and Theis et al. (2006). While these works used comparable stated preference data from different survey waves, the analyses all focussed on different issues, used different methods and for various other reasons did not produce directly comparable results. In contrast with these previous studies, we make use of a consistent specification and the same model structure across the stated preference data from the survey waves representing 2000, 2001, 2002 and 2005.[1]

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[1] Data from the 2008 survey wave are not included as the extra complexity introduced by the inclusion of access mode choice in this data limits the scope for using the generic specification.

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2. Data

Each of the survey questionnaires used the same basic structure for the stated preference exercises. The characteristics of the itinerary used for each traveller's most recent flight were shown as the "Current Flight" and an "Alternative Flight" was also presented to the same destination airport. Service details were changed in ways that made the alternative flight realistic, while allowing all service attributes, including originating airport, to change.

The factors used to describe the flight alternatives included the following basic service elements:

- Fare
- Scheduled trip time
- Number of connections
- On-time performance
- Aircraft type
- Airline
- Departure airport
- Arrival time (difference from most preferred time)

The stated preference exercises in the 2000, 2001 and 2002 surveys were identically structured, with an example choice screen shown in Fig. 1. The stated preference exercises in the 2005 survey wave were re-structured to provide more detailed information about flight connections in itineraries that included one or more connections; an example choice screen is shown in Fig. 2. Despite the small differences between the 2005 survey and the other surveys, there is a high degree of similarity that allows comparisons of results across them without undue influence of the design.

In each of the surveys, the underlying experimental design encouraged respondents to trade between the different attributes, e.g. a typical scenario might involve the choice between the current flight and a slower service that is however cheaper. A target sample of around 600 respondents was used in each sample, where this was collected via the internet from travellers who had made a domestic air trip in the last twelve months. In the first three waves of the survey, each respondent was presented with ten choice scenarios, while, in the 2005 edition, this was reduced to eight choice sets per respondent. The samples were collected in May 2000, June 2001, November 2002, and May 2005. The split in terms of income and journey purpose was broadly comparable across the samples, where roughly 20% of respondents were travelling for business reasons.

We also investigate trends along three other dimensions; the ticket purchase channel, fare transparency in the form of whether a respondent feels they found the best available fare, and the amount of time a respondent arrived at the airport prior to the scheduled departure time. We see the expected strong growth in internet bookings, especially through an airline's website. This growing reliance on internet bookings is also strongly linked to increasing fare transparency, as highlighted in the increasing share of respondents who feel they found the best available fare. Finally, we find a strong increase in the amount of time respondents arrived prior to departure for 2002 and 2005, most likely linked to increased screening measures after the terrorist attacks in September 2001; the 2001 sample was collected in June 2001.

3. Model specification

The analysis of the data made of use of discrete choice structures belonging to the family of random utility models (cf. Train, 2003). A linear in attributes specification of the utility function was used for all models, where, with a view to facilitating comparisons across datasets, as generic an approach as possible was used. With the main interest being the comparison of willingness to pay (WTP) indicators across datasets, the various models were all estimated in WTP space, thus providing direct estimates for the WTP measures (Train and Weeks, 2005).

The final model specification involved the estimation of the following key parameters:

- An alternative specific constant (ASC) associated with the first alternative
- A marginal utility coefficient for fare, with the attribute being valued in dollars. In a WTP specification, this coefficient takes the role of a scale parameter
- The WTP for reductions in flight time and access time

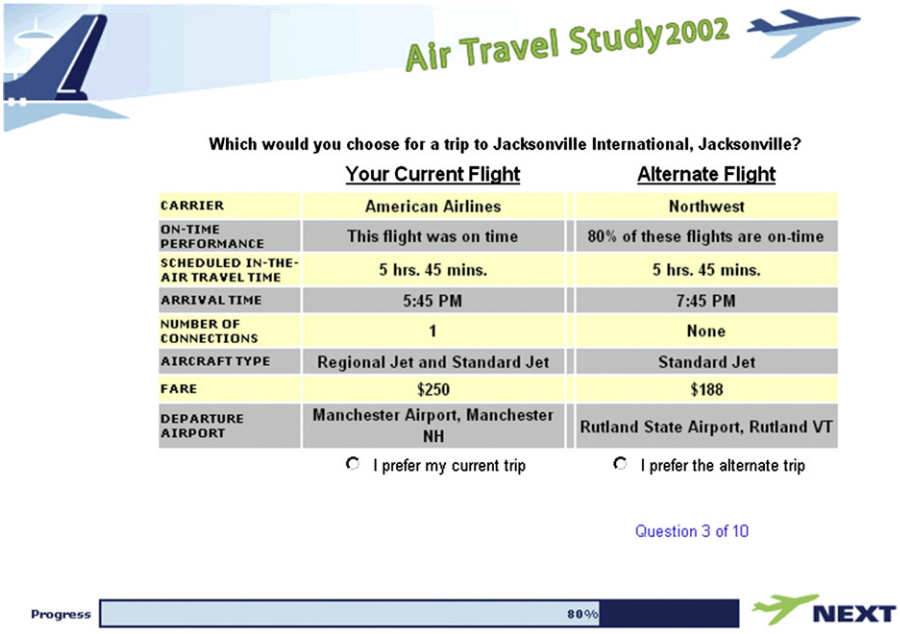

Fig. 1. Example choice scenario in 2002 survey.